



# VOLUME I

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## Minimum Technical Requirements & Site Planning

# Volume I



- Chapter 1 – Introduction
- Chapter 2 – Minimum Requirements
- Chapter 3 – Preparation of Stormwater Site Plans
- Chapter 4 – BMP & Facility Selection Process
- Appendices & Glossary

# Chapter 1

## Introduction

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- Organization
- Description of BMP Types
- Relationship to Other Programs/Requirements
- Effects of Urbanization

# Chapter 2

## Minimum Requirements

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For New Development &  
Redevelopment



# Section 2.2 - Exemptions



- **Forestry & Commercial Agriculture**
  - Conversion to Ag. Land & Impervious Surface Construction not exempt
- **Road Maintenance**
  - Remove to base course, extend pavement edge, paving shoulder, surface upgrades not exempt
- **Underground Utility Projects**
  - Replace surface with in-kind = exempt except Erosion Control

# Section 2.3 - Definitions



- **Effective Impervious Surface**
- **Pollution-Generating Impervious Surface (PGIS)**
- **Pollution-Generating Pervious Surface (PGPS)**
- **Land Disturbing Activity**
- **Threshold Discharge Area**



# Section 2.4 - Project Thresholds



- Who needs to do what?
- Depends upon size of the project
  - Amount of impervious surface
  - Extent of land disturbed

# New Development Thresholds



- ❑ **Min. Req. #2 -Erosion control**

- ⇒ all projects

- ❑ **Min. Requirements #1 - #5:**

- ⇒ 2,000 sq. ft. impervious area, or 7,000 sq. ft. land disturbance

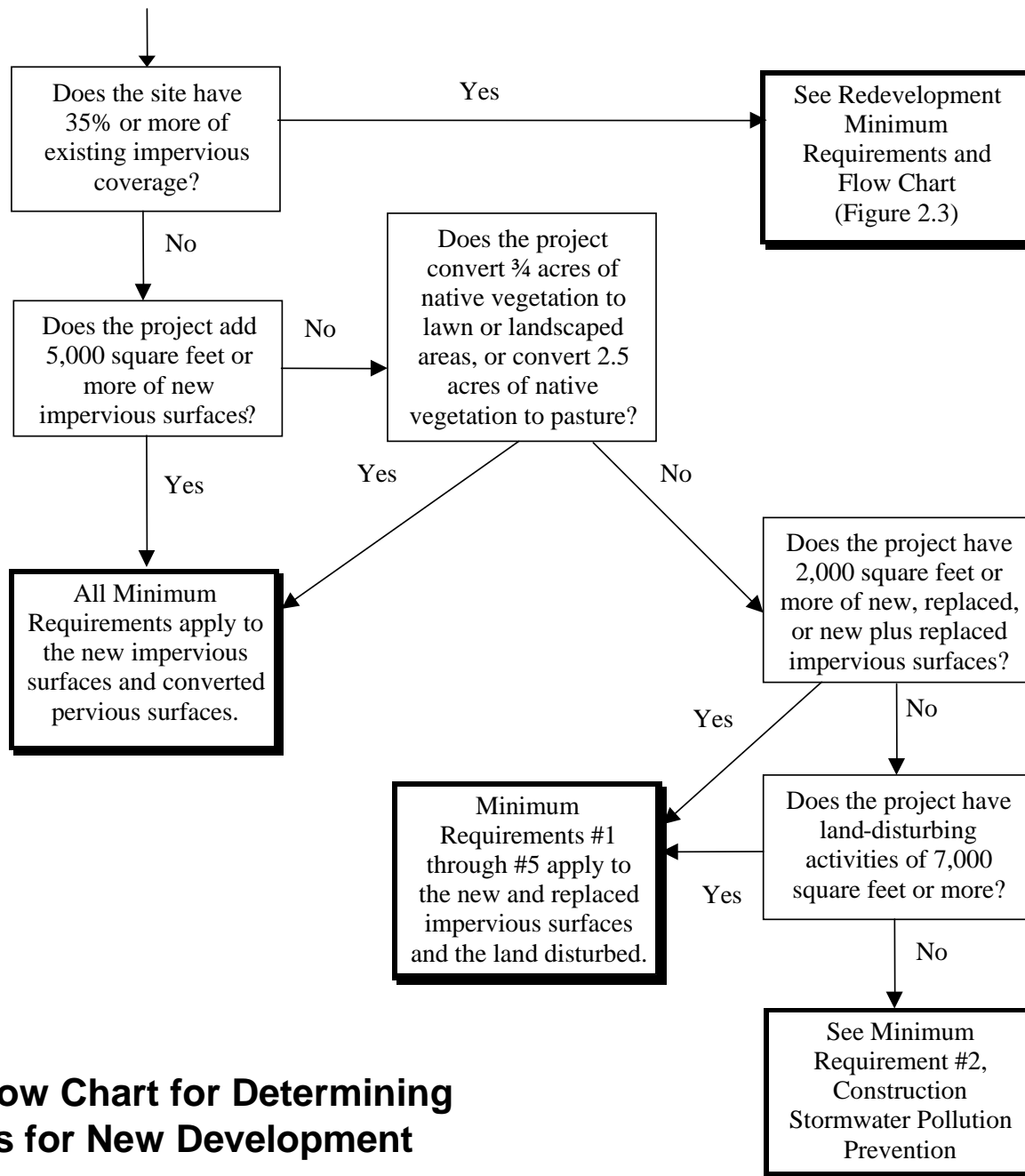
- ❑ **Min. Requirements #1 - #10:**

- ⇒ 5,000 sq. ft. new impervious area, or

- ⇒ 3/4 acre native vegetation to lawn/Inscpe, or

- ⇒ 2.5 acres native vegetation to pasture





**Figure 2.2 Flow Chart for Determining Requirements for New Development**

# Redevelopment Threshold Summary

## New impervious or Converted Pervious

– Same as “New Development”

- Replaced impervious surfaces

⇒ Treatment and Flow Control only if

- New + replaced impervious  $\geq 5,000$  sq. ft., and Proposed improvements value  $> 50\%$  of existing improvements value
- For roads, new impervious  $\geq 5,000$  sq. ft., and  $\geq 50\%$  of existing impervious area



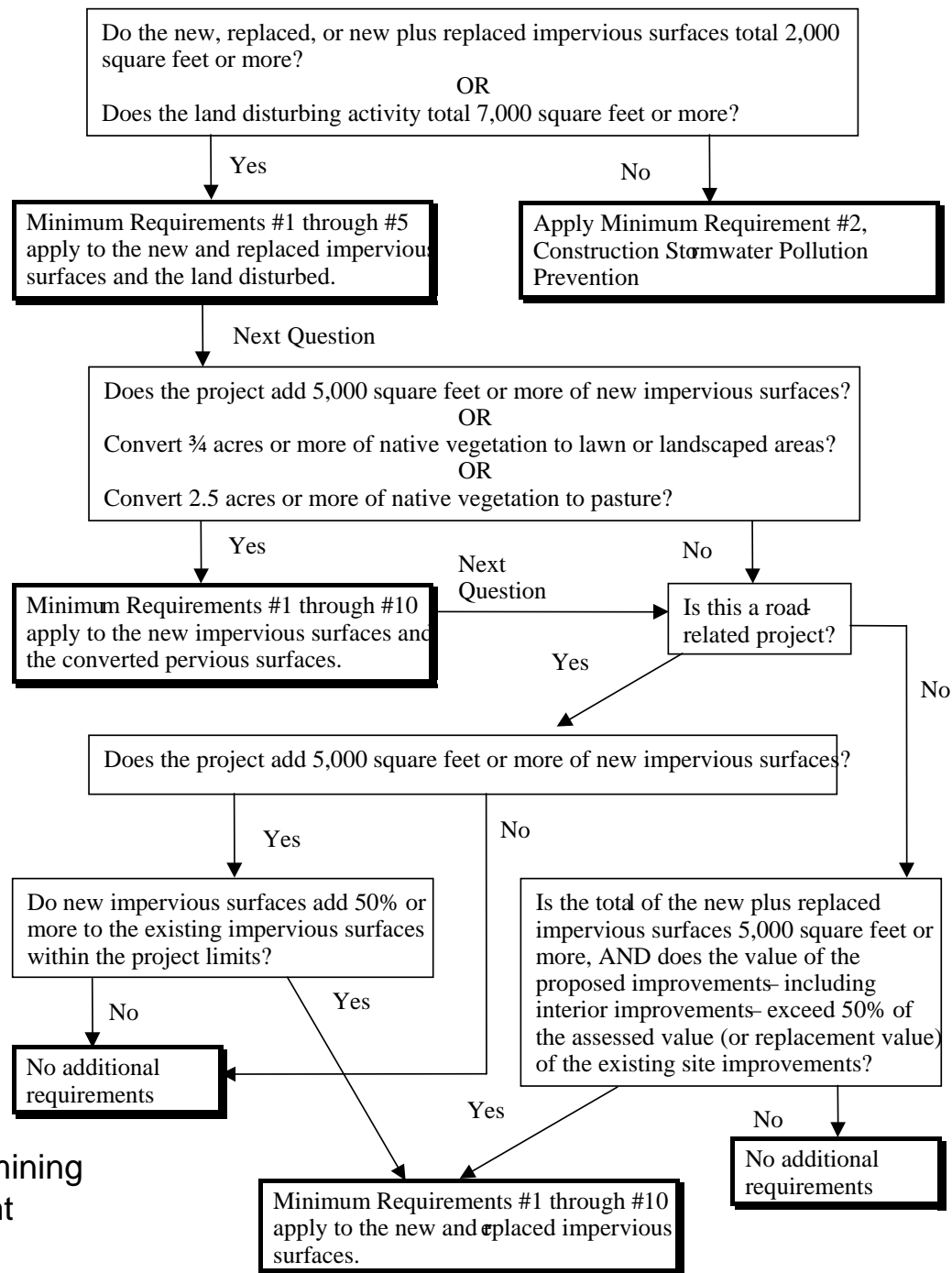


Figure 2.3 Flow Chart for Determining Requirements for Redevelopment

# Redevelopment Scope

- **Existing Surfaces That Aren't Replaced**
  - Only addressed if runoff not separated
    - Treatment facilities must be sized for flows that they receive
    - Flow Control facilities have a limit on “offsite inflow” that can be accepted



# Redevelopment Exemption



- **Replaced Impervious Surfaces**
  - If Plan and Schedule for Regional Facilities
- **New Impervious surfaces are not exempted.**
  - Regional facilities should be on-line or imminent.

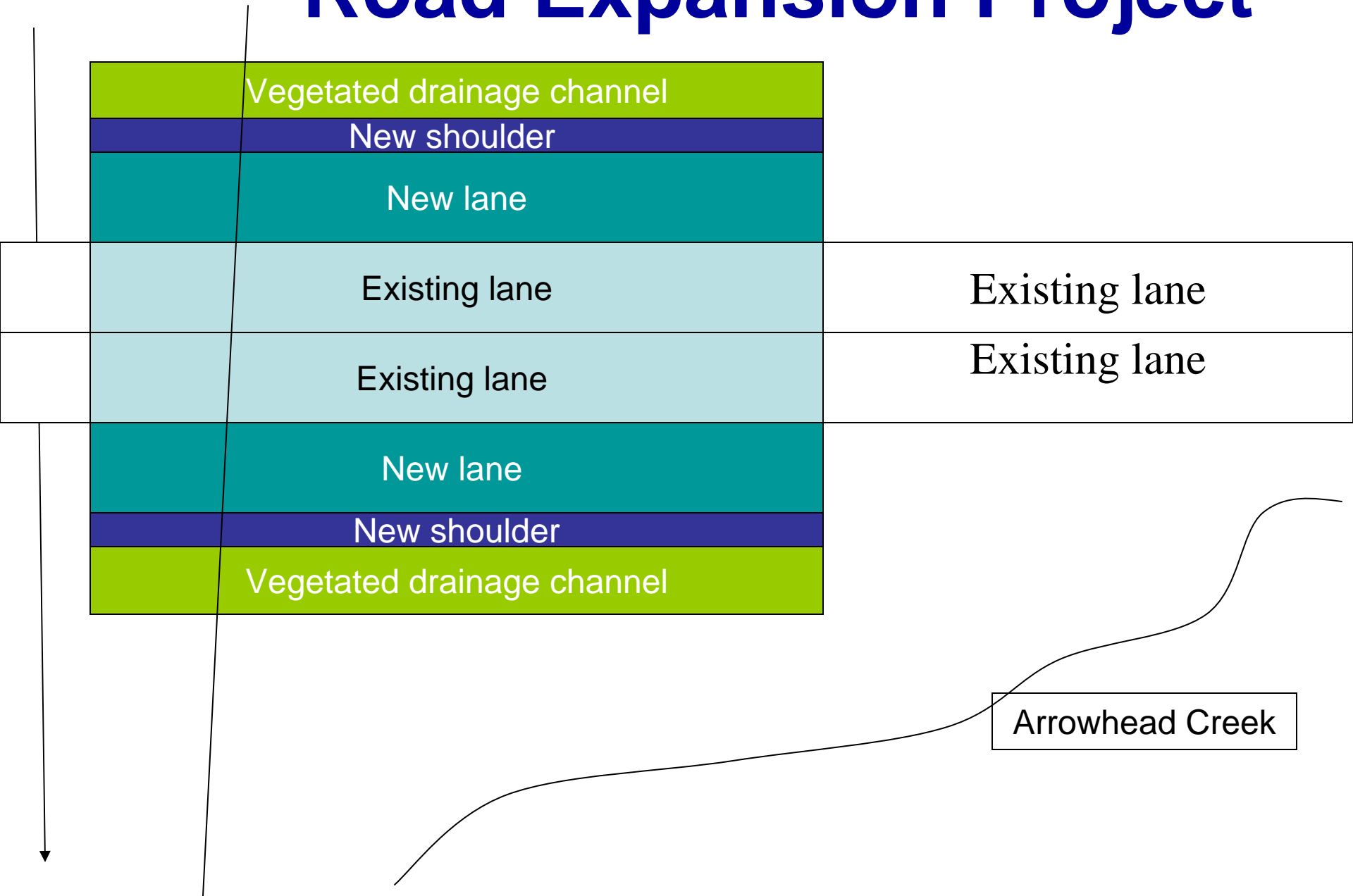
# Alternative Mitigation for Redevelopment Sites



- Equivalent Area within Site
- For Roads, Equivalent Area must drain to same receiving water
- Supplemental Guidelines
  - Fee-in-lieu



# Road Expansion Project



# Equivalent Redevelopment Requirement

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- Number and types of projects subject to similar requirements

# Minimum Requirements

## Section 2.5



1. Preparation of Stormwater Site Plans
2. Construction Stormwater Pollution Prevention
3. Source Control of Pollution
4. Preservation of Natural Drainage Systems and Outfalls
5. Onsite Stormwater Management

# Minimum Requirements

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**6. Runoff Treatment**

**7. Flow Control**

**8. Wetlands Protection**

**9. Basin/Watershed Planning**

**10. Operation and Maintenance**

# Minimum Requirement #1

## Stormwater Site Plan Preparation

- Over 2,000/7,000: Submit for local government review
- Stormwater Site Plan
  - Prepare a Permanent Stormwater Quality Control Plan
  - Prepare a Construction Stormwater Pollution Prevention Plan



# Minimum Requirement #2

## Construction Stormwater Pollution Prevention



- **Construction SWPPP - reviewed by local government**
  - 2,000 sf of impervious surface (new & replaced total)
  - or disturb 7,000 square feet of land
- **Each of 12 elements must be considered and included in the Construction SWPPP**
  - unless unnecessary and clearly justified in the narrative



# Minimum Requirement #2

## Construction Stormwater Pollution Prevention

- **Small projects < 2,000/7,000**
  - consider 12 Elements and develop controls for all pertinent elements
  - **No SWPPP submittal**
  - **Suggested Implementation**
    - **Instructions with Building Permit**



# The 12 Elements are



- Mark Clearing Limits
- Establish Construction Access
- Control Flow Rates
- Install Sediment Controls
- Stabilize Soils
- Protect Slopes
- Protect Drain Inlets
- Stabilize Channels And Outlets
- Control Pollutants
- Control De-Watering
- Maintain BMPs
- Manage the Project

# Minimum Requirement #2



- Concepts Similar to '92
- **Significantly More Detail**
  - **All in bold - equivalency**
  - **More explicit expectations**

# Minimum Requirement #3

## Source Control

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- Prevention is still best strategy
- Requires Source Control BMPs for areas and activities described in Chapter 2 of Volume IV
- Applies primarily to Commercial/Industrial

# Minimum Requirement #4

## Preservation of Natural Drainage Systems and Outfalls



- **Maintain natural drainage patterns**
- **Discharge at the natural location**
- **No adverse impact to receiving waters and properties.**
  - See Supplemental Guidelines
- **Outfall energy dissipation.**



# Minimum Requirement #5

## On-Site Stormwater Management

- **Intent: reduce hydrologic change**
- **Apply on-site BMPs to infiltrate, disperse, and retain runoff**
  - Reference BMPs
- **Equivalency extends to BMPs**
- **Applies primarily to Residential Areas**



# Minimum Requirement #6

## Runoff Treatment

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- **Thresholds**
- **Facility Sizing**
- **Selection**
- **Design**
- **Maintenance**

# Runoff Treatment Thresholds

Table 2.1 Treatment Requirements by Threshold Discharge Area

	< $\frac{3}{4}$ acres of PGPS	$\geq \frac{3}{4}$ acres PGPS	< 5,000 sf PGIS	$\geq 5,000$ sf PGIS
Treatment Facilities		✓		✓
Onsite Stormwater BMPs	✓	✓	✓	✓

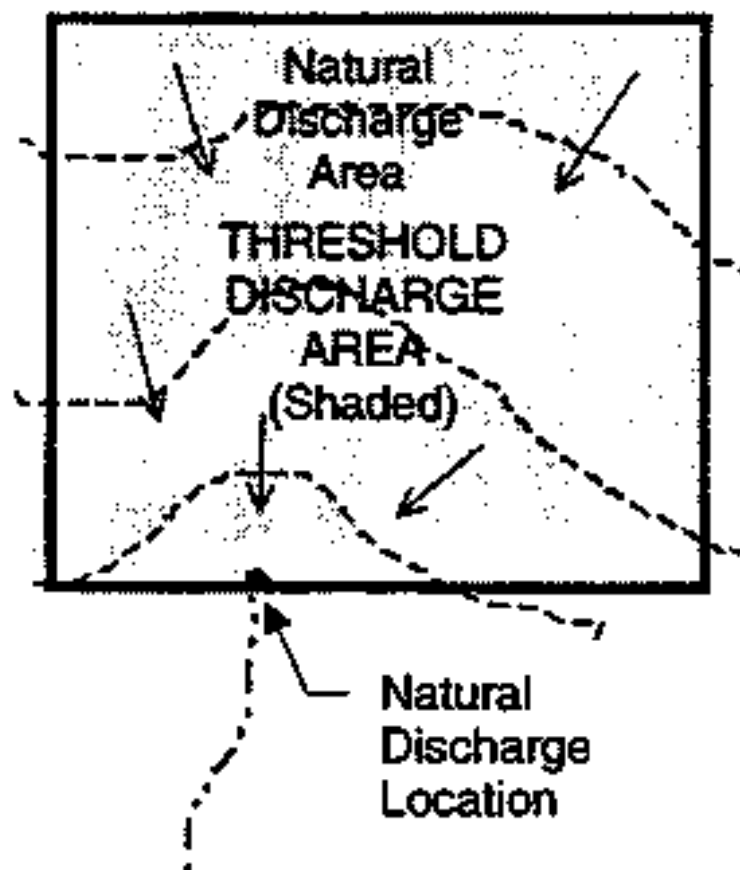
PGPS = pollution-generating pervious surfaces

PGIS = pollution-generating impervious surfaces

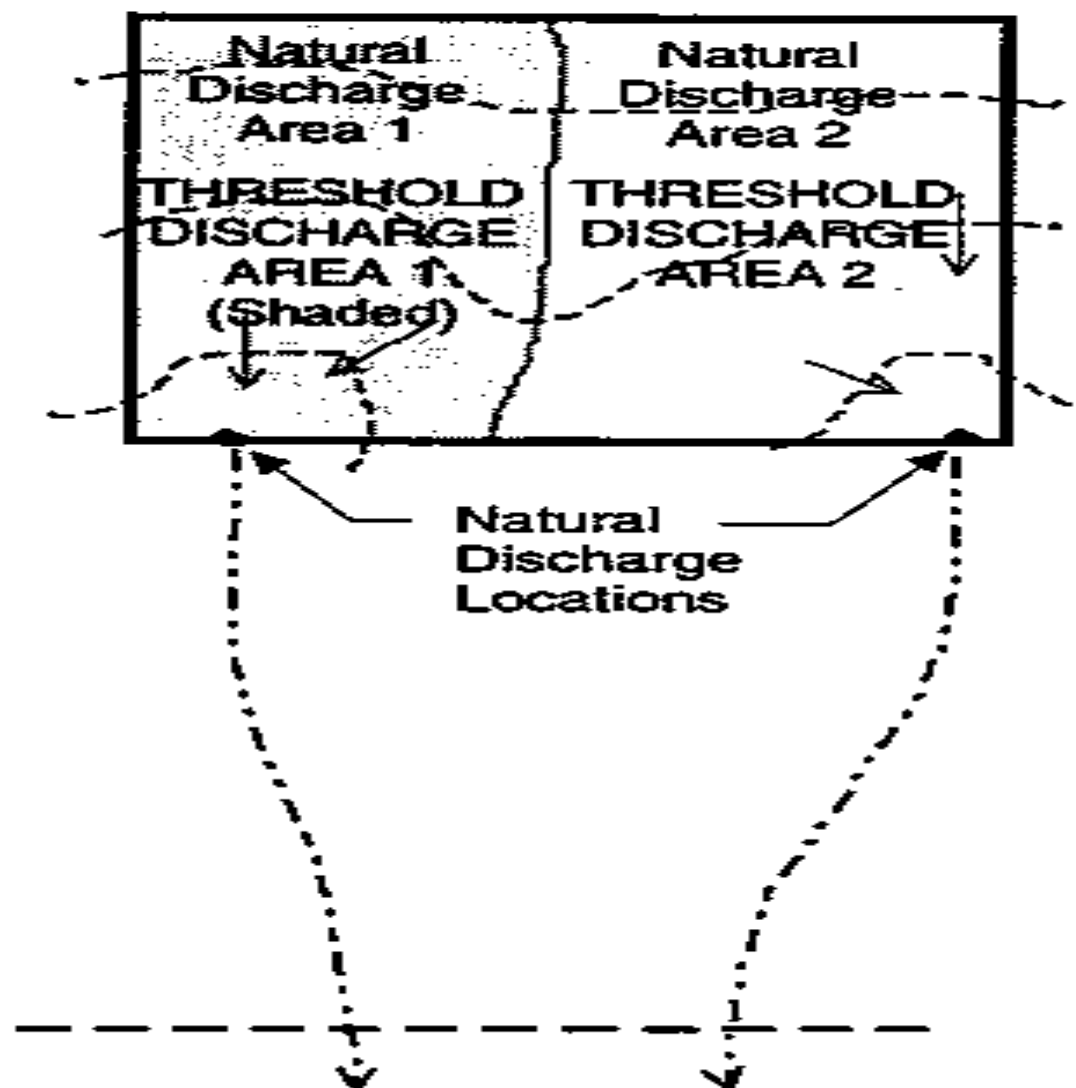
sf = square feet



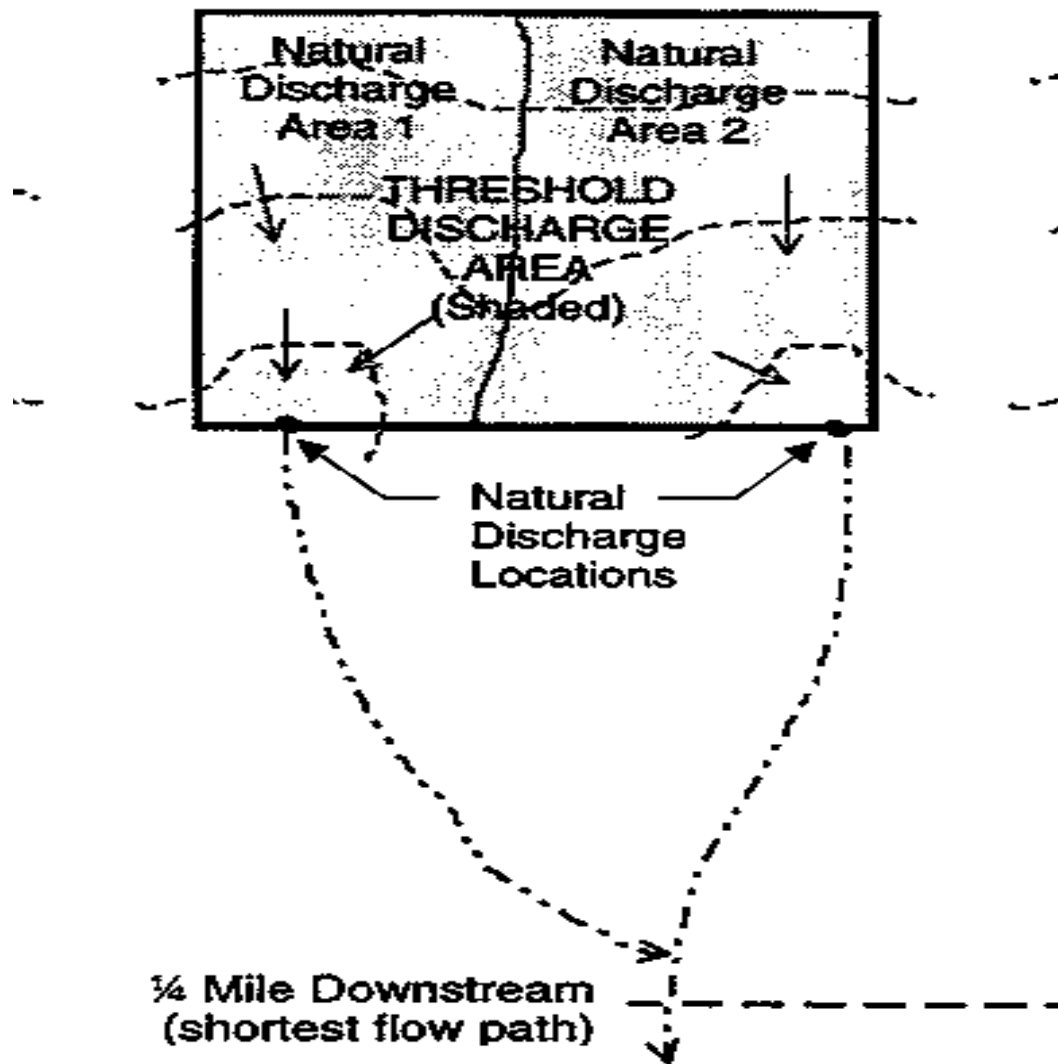
**Example of a Project Site  
with a Single Natural  
Discharge and a Single  
Threshold Discharge Area**



**Example of a Project Site  
with Multiple Natural  
Discharges and Multiple  
Threshold Discharge Areas**



**Example of a Project Site  
with Multiple Natural  
Discharges and a Single  
Threshold Discharge Area**



# Runoff Treatment Facility Sizing

- **Water Quality Design Storm**
  - 6-month, 24-hour event
  - Appendix B
  - New Estimate: 72% of 2-year, 24-hour
  - Applies to Wetpool Facilities
    - Ponds, Vaults, Wetlands, Combined Detention/Wetpool





# Runoff Treatment Facility Sizing

- **Water Quality Design Flow Rate**
  - **Preceding Detention**
    - Flow Rate at or below which 91% of the runoff volume will be treated
    - Need continuous runoff model
  - **Downstream of Detention**
    - The 2-year release rate from detention



# Treatment Facility Selection, Design, Maintenance



- **Selection Process Similar to Volume I, Ch. 4**
  - Similar BMP Options for similar situations
- **Use Similar Design Criteria**
  - Must result in approx. equal sized facilities or equivalent pollutant removal capability
- **Use Equivalent Maintenance Requirements**

# Minimum Requirement #6

## Runoff Treatment

- Treatment Levels
  - Basic Treatment
  - Enhanced Treatment
  - Phosphorus Treatment
  - Oil Control
- Each Level has a Menu of BMPs
  - Volume V, Ch. 4



# Minimum Requirement #6

## Runoff Treatment



- Intent: Meet federal & state laws
- Basic & Oil Control Treatment = Presumptive technology-based
- Phosphorus/Enhanced = Presumptive water quality-based
- Adjustment of Presumptive Requirements through case-by-case or watershed analysis

# Minimum Requirement #7

## Flow Control



- Purpose: To prevent increases in stream channel instability or erosion rates
- Presumptive Water Quality-Based Requirement
  - Local hydrogeologic basis



A black and white photograph of a forest stream. The stream flows through a dense forest, with numerous tree roots exposed along its banks. The water is shallow and clear, reflecting the surrounding foliage. The banks are covered in ferns and other forest plants. The overall scene is a natural, undisturbed forest environment.

**Easter Lk. Outlet,  
Federal Way, WA**

Photo by Derek Booth, U of W

# Flow Control

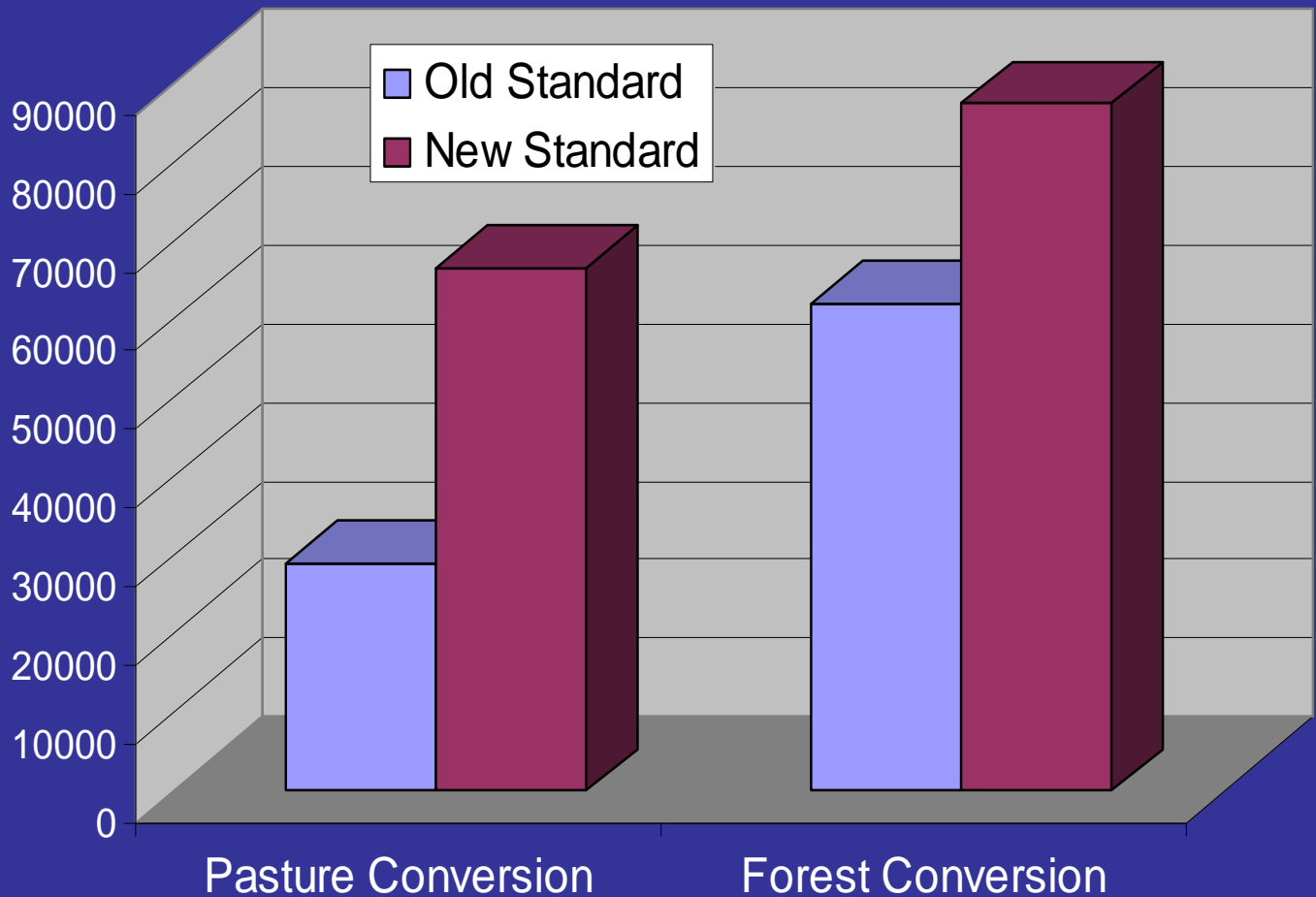
## Standard Requirement:

- Flow Durations. Match Pre-developed discharge rates from 50% of 2-year to 50-year peak flows
- Assume forested pre-developed condition unless evidence otherwise
- Peak Flow matching not required.
  - Local Governments may want to retain





# Detention Volume Comparison Old Standard Vs. New Standard





# Flow Control

- Direct Discharge Exemption
  - Local government petitions/hydrologic basis
- Alternative Requirements
  - Based on watershed-specific studies
  - Protect beneficial uses
- Select, Design, Maintain

# Flow Control Thresholds

**Table 2.2 Flow Control Requirements by Threshold Discharge Area**

	Flow Control Facilities	On-site Stormwater Management BMPs
< $\frac{3}{4}$ acres conversion to lawn/landscape, or < 2.5 acres to pasture		✓
$\geq \frac{3}{4}$ acres conversion to lawn/landscape, or $\geq 2.5$ acres to pasture	✓	✓
< 10,000 square feet of effective impervious area		✓
$\geq 10,000$ square feet of effective impervious area	✓	✓
$\geq 0.1$ cubic feet per second increase in the 100-year flood frequency	✓	✓





# Method for Compliance

- **Continuous Simulation Model**
  - Hydrologic Simulation Program-Fortran (HSPF)
  - WWHM is an application of HSPF for Western Washington
- **Flow Routing/Pond Sizing Program**
  - Under Development

# Minimum Requirement #8

## Wetlands Protection



- Thresholds same as M.R. #6 and #7
- Apply treatment BMP
- Maintain hydrologic conditions, vegetation, substrate – requires continuous runoff model
- Use Puget Sound Wetlands Research Program as amended in Appendix I-D
- Facilities not in natural buffer

# Minimum Requirement #9

## Basin/Watershed Planning

- Local Government Option
- Equivalent or more stringent requirements for erosion control, source control, treatment, O&M
- Alternative flow control, wetlands protection requirements, (Enhanced)
- Clean Water Act consistency/State agrees
- Appendix I-A examples





# Minimum Requirement #10

## Operation and Maintenance

- O&M manual for all facilities
- Responsible parties identified
- Local governments adopt equivalent O&M standards
  - Volume V, Section 4.6
- Manual readily available





# Optional Guidance

## Section 2.6



- **#1 Financial Liability**
  - Guarantee for construction of facilities
  - 2 year performance and maintenance guarantee
- **#2 Off-Site Analysis and Mitigation**
  - Part of Stormwater Site Plan
  - Evaluate and mitigate water quality, erosion, slope stability, & drainage impacts

# Adjustments

## Section 2.7



- **Administrator Decision**
- **Written Finding of Fact**
  - **Equivalent Protection**
  - **Listed Objectives are met**

# Exceptions

## Section 2.8



- **Public Notice**
  - Application
  - Decision
- **Written Finding of Fact**
- **Three Qualifying Criteria**

# Chapter 3

## SW Site Plan Preparation



- **Collect and Analyze Existing Conditions Information**
- **Prepare Preliminary Layout**
- **Perform Off-site Analysis (option)**
- **Determine Applicable Minimum Requirements**

# Stormwater Site Plans (cont.)



- Prepare a Permanent Stormwater Control Plan
- Prepare a Construction Stormwater Pollution Prevention Plan
- Complete the Stormwater Site Plan
- Check Compliance

# Chapter 4 - Permanent Stormwater Control Plans



- Determine Applicable Minimum Requirements
- Select Source Control BMPs
- Determine Threshold Discharge Areas, Flow Control & Treatment Requirements
  - Table 2.2 for Flow Control
  - Table 2.1 for Treatment



# Permanent Stormwater Control Plans (cont.)



- **Select Flow Control BMPs and Facilities**
  - Infiltrate?
  - Size Detention Facility and Orifices - Ecology Hydrology Model
- **Select Treatment Facilities**
  - Figure 4.1, page 75
- **Review Selections**
- **Complete PSCP**





# General Questions

